

1 CLAIMS

2 I claim:

3 1. A fungal inoculant composition comprising seeds and a fungal inocula
4 selected from the group of fungi consisting of saprophytic fungi,
5 entomopathogenic fungi and combinations thereof.

6 2. The fungal inoculant composition of claim 1 wherein the seeds are
7 selected from the group consisting of seed of garden vegetables, agricultural
8 crops, grasses, herbs, shrubs, and trees and the fungal inocula is selected
9 from the group consisting of spores, conidia, actively growing mycelial
10 hyphae, dried mycelial hyphae, freeze-dried mycelial hyphae, powdered
11 mushrooms and mixtures thereof.

12 3. The fungal inoculant composition of claim 1 wherein the fungal inocula
13 further comprises a fungi selected from the group consisting of mycorrhizal
14 fungi, parasitic fungi, fungi imperfecti and combinations thereof.

15 4. The fungal inoculant composition of claim 3 wherein the fungi is selected
16 from the group consisting of:

17 a) gilled mushrooms including *Agaricus*, *Agrocybe*, *Armillaria*, *Clitocybe*,
18 *Collybia*, *Conocybe*, *Coprinus*, *Flammulina*, *Giganopanus*, *Gymnopilus*,
19 *Hypholoma*, *Inocybe*, *Hypsizygus*, *Lentinula*, *Lentinus*, *Lenzites*,
20 *Lepiota*, *Lepista*, *Lyophyllum*, *Macrocybe*, *Marasmius*, *Mycena*,
21 *Omphalotus*, *Panaeolus*, *Panellus*, *Pholiota*, *Pleurotus*, *Pluteus*,

1 *Psathyrella, Psilocybe, Schizophyllum, Sparassis, Stropharia,*
2 *Termitomyces, Tricholoma, Volvariella* and combinations thereof;
3 b) polypore mushrooms including *Albatrellus, Antrodia, Bjerkandera,*
4 *Bondarzewia, Bridgeoporus, Ceriporia, Coltricia, Daedalea,*
5 *Dentocorticium, Echinodontium, Fistulina, Flavodon, Fomes,*
6 *Fomitopsis, Ganoderma, Gloeophyllum, Grifola, Hericium,*
7 *Heterobasidion, Inonotus, Irpex, Laetiporus, Meripilus, Oligoporus,*
8 *Oxyporus, Phaeolus, Phellinus, Piptoporus, Polyporus, Schizopora,*
9 *Trametes, Wolfiporia* and combinations thereof;
10 c) Basidiomycetes including *Auricularia, Calvatia, Ceriporiopsis,*
11 *Coniophora, Cyathus, Lycoperdon, Merulius, Phlebia, Serpula,*
12 *Sparassis, Stereum* and combinations thereof;
13 d) Ascomycetes including *Cordyceps, Morchella, Tuber, Peziza* and
14 combinations thereof;
15 e) jelly fungi including *Tremella*;
16 f) the mycorrhizal mushrooms and endomycorrhizal and ectomycorrhizal
17 non-mushroom fungi including *Acaulospora, Alpova, Amanita,*
18 *Astraeus, Athelia, Boletinellus, Boletus, Cantharellus, Cenococcum,*
19 *Dentinum, Gigaspora, Glomus, Gomphidius, Hebeloma, Lactarius,*
20 *Paxillus, Piloderma, Pisolithus, Rhizophagus, Rhizopogon, Rozites,*

1 *Russula, Sclerocytis, Scleroderma, Scutellospora, Suillus, Tuber* and
2 combinations thereof;

3 g) fungi with a perfect and an imperfect state including *Phanerochaete*
4 and *Cordyceps* and combinations thereof;

5 h) the fungi imperfecti and related molds and yeasts including
6 *Actinomyces, Alternaria, Aspergillus, Botrytis, Candida, Chaetomium,*
7 *Chrysosporium, Cladosporium, Cryptococcus, Dactylium, Doratomyces*
8 *(Stysanus), Epicoccum, Fusarium, Geotrichum, Gliocladium,*
9 *Humicola, Monilia, Mucor, Mycelia Sterilia, Mycogone, Neurospora,*
10 *Papulospora, Penicillium, Rhizopus, Scopulariopsis, Sepedonium,*
11 *Streptomyces, Talaromyces, Torula, Trichoderma, Trichothecium,*
12 *Verticillium* and combinations thereof; and

13 i) entomopathogenic fungi including *Metarhizium, Beauveria,*
14 *Paecilomyces, Verticillium, Hirsutella, Aspergillus, Akanthomyces,*
15 *Desmidiospora, Hymenostilbe, Mariannaea, Nomuraea, Paraisaria,*
16 *Tolypocladium, Spicaria, Botrytis, Rhizopus*, the Entomophthoraceae
17 and other Phycomycetes, *Cordyceps* and combinations thereof.

18 5. The fungal inoculant composition of claim 1 wherein the composition
19 further comprises seedlings.

20 6. The fungal inoculant composition of claim 1 wherein the fungal
21 inoculant further comprises a liquid.

1 7. The fungal inoculant composition of claim 6 wherein the liquid is
2 selected from the group consisting of water, vegetable oils, lubricants and
3 mixtures thereof.

4 8. The fungal inoculant composition of claim 1 wherein the fungal
5 inoculant is applied to a fiber substrate material.

6 9. The fungal inoculant composition of claim 8 wherein the fiber substrate
7 material is selected from the group consisting of landscaping cloth, mulch,
8 paper products and cardboard.

9 10. The fungal inoculant composition of claim 9 wherein the landscaping
10 cloth material is selected from the group consisting of geocloths, geofabrics,
11 soil blankets, landscaping fabrics, fabrics, nettings, rugs, mats, mattings,
12 fiber felt pads, tatamis, mattress inserts, burlap bags, gabions, fiber logs,
13 fiber bricks, fiber baskets, pressed cardboards, corrugated cardboards, papers
14 and combinations thereof and the mulch material is selected from the group
15 consisting of mulches of wood chips, sawdust, wood pulp, straw, cardboard,
16 agricultural waste fibers, composts and combinations thereof.

17 11. The fungal inoculant composition of claim 9 wherein the mulch is
18 dispersed by equipment selected from the group consisting of hydroseeding
19 equipment, pressure spray equipment and agricultural equipment.

20 12. The fungal inoculant composition of claim 8 wherein the fiber substrate
21 material comprises a fiber selected from the group consisting of wood, wood

1 chips, sawdust, wood pulp, wood wastes, wood pellets, paper fiber pellets, leaf
2 paper, wood-based papers, non-wood papers, pressed cardboard, corrugated
3 cardboard, fiberized rag stock, cellophane, hemp and hemp-like materials,
4 bamboo, papyrus, jute, flax, sisal, coconut husk fibers, cereal straws, reeds,
5 grasses, seed hulls, cornstalks, corncobs, soybean roughage, coffee plants,
6 coffee waste, coffee pulp, sugar cane bagasse, banana fronds, palm leaves, nut
7 hulls, soy waste, cactus waste, tea leaves, agricultural waste products, wool,
8 hair, hide and combinations thereof.

9 13. The fungal inoculant composition of claim 8 wherein the fiber substrate
10 additionally comprises an amendment selected from the group consisting of
11 germination enhancers, growth enhancers, sugars, molasses, sorghum,
12 mannitol, sorbitol, corn steep liquor, corn meal and soybean meal, vegetable
13 oils, casein hydrolysate, grain brans, grape pumice, ammonium salts, amino
14 acids, yeast extract, vitamins, nutritional supplements, surface active agents,
15 wetting agents, spore encapsulating materials, hyphae encapsulating
16 materials, yeasts, bacteria, fungi imperfecti and combinations thereof.

17

18 14. A fungal inoculant composition comprising:

19 a) a saprophytic mushroom inoculant selected from the group consisting
20 of spores, actively growing mycelial hyphae, dried mycelial hyphae,

- 1 freeze-dried mycelial hyphae, powdered mushrooms and mixtures
- 2 thereof;
- 3 b) a fiber substrate transfer agent selected from the group consisting of
- 4 landscaping cloths, mulch and combinations thereof;
- 5 c) wherein the landscaping cloths are selected from the group consisting
- 6 of geocloths, geofabrics, soil blankets, landscaping fabrics, fabrics,
- 7 nettings, rugs, mats, mattings, fiber felt pads, tatamis, mattress
- 8 inserts, burlap bags, fiber logs, fiber bricks, fiber baskets, gabions,
- 9 fiber ropes, pressed cardboard, corrugated cardboards, papers and
- 10 combinations thereof; and
- 11 d) wherein the mulch comprises a material selected from the group
- 12 consisting of mulches prepared from wood chips, sawdust, wood pulp,
- 13 straw, compost, agricultural waste products, cardboard, paper and
- 14 combinations thereof.
- 15 15. The mycofiltration composition of claim 14 wherein the saprophytic
- 16 mushroom inoculant comprises inoculant of a saprophyte selected from the
- 17 group consisting of:
 - 18 a) gilled mushrooms including *Agaricus*, *Agrocybe*, *Armillaria*, *Clitocybe*,
 - 19 *Collybia*, *Conocybe*, *Coprinus*, *Flammulina*, *Giganopanus*, *Gymnopilus*,
 - 20 *Hypholoma*, *Inocybe*, *Hypsizygus*, *Lentinula*, *Lentinus*, *Lenzites*,
 - 21 *Lepiota*, *Lepista*, *Lyophyllum*, *Macrocybe*, *Marasmius*, *Mycena*,

- 1 *Omphalotus, Panaeolus, Panellus, Pholiota, Pleurotus, Pluteus,*
- 2 *Psathyrella, Psilocybe, Schizophyllum, Sparassis, Stropharia,*
- 3 *Termitomyces, Tricholoma, Volvariella* and combinations thereof;
- 4 b) polypore mushrooms including *Albatrellus, Antrodia, B jerkandera,*
- 5 *Bondarzewia, Bridgeoporus, Ceriporia, Coltricia, Daedalea,*
- 6 *Dentocorticium, Echinodontium, Fistulina, Flavodon, Fomes,*
- 7 *Fomitopsis, Ganoderma, Gloeophyllum, Grifola, Hericium,*
- 8 *Heterobasidion, Inonotus, Irpex, Laetiporus, Meripilus, Oligoporus,*
- 9 *Oxyporus, Phaeolus, Phellinus, Piptoporus, Polyporus, Schizophora,*
- 10 *Trametes, Wolfiporia* and combinations thereof;
- 11 c) Basidiomycetes including *Auricularia, Calvatia, Ceriporiopsis,*
- 12 *Coniophora, Cyathus, Lycoperdon, Merulius, Phlebia, Serpula,*
- 13 *Sparassis and Stereum;*
- 14 d) Ascomycetes including *Cordyceps, Morchella, Tuber, Peziza* and
- 15 combinations thereof; and
- 16 e) jelly fungi including *Tremella.*
- 17 16. The mycofiltration composition of claim 15 wherein the saprophytic
- 18 mushroom inoculant additionally comprises inoculant of fungi selected from
- 19 the group consisting of:
- 20 a) the mycorrhizal mushrooms and endomycorrhizal and ectomycorrhizal
- 21 non-mushroom fungi including *Acaulospora, Alpova, Amanita,*

1 *Astraeus, Athelia, Boletinellus, Boletus, Cantharellus, Cenococcum,*
2 *Dentinum, Gigaspora, Glomus, Gomphidius, Hebeloma, Lactarius,*
3 *Paxillus, Piloderma, Pisolithus, Rhizophagus, Rhizopogon, Rozites,*
4 *Russula, Sclerocytis, Scleroderma, Scutellospora, Suillus, Tuber* and
5 combinations thereof;

6 b) fungi with a perfect and an imperfect state including *Phanerochaete*
7 and *Cordyceps* and combinations thereof;

8 c) the fungi imperfecti and related molds and yeasts including

9 *Actinomyces, Alternaria, Aspergillus, Botrytis, Candida, Chaetomium,*
10 *Chrysosporium, Cladosporium, Cryptococcus, Dactylium, Doratomyces*
11 *(Stysanus), Epicoccum, Fusarium, Geotrichum, Gliocladium,*
12 *Humicola, Monilia, Mucor, Mycelia Sterilia, Mycogone, Neurospora,*
13 *Papulospora, Penicillium, Rhizopus, Scopulariopsis, Sepedonium,*
14 *Streptomyces, Talaromyces, Torula, Trichoderma, Trichothecium,*
15 *Verticillium* and combinations thereof; and

16 d) entomopathogenic fungi including *Metarhizium, Beauveria,*
17 *Paecilomyces, Verticillium, Hirsutella, Aspergillus, Akanthomyces,*
18 *Desmidiospora, Hymenostilbe, Mariannaea, Nomuraea, Paraisaria,*
19 *Tolypocladium, Spicaria, Botrytis, Rhizopus*, the Entomophthoraceae
20 and other Phycomycetes, *Cordyceps* and combinations thereof.

1 17. The mycofiltration composition of claim 14 wherein the saprophytic
2 mushroom inoculant comprises a mushroom species selected from the group
3 consisting of *Pleurotus* species, *Trametes* species, *Ganoderma* species, *Fomes*
4 *fomentarius*, *Fomitopsis officinalis*, *Fomitopsis pinicola*, *Stropharia*
5 *rugosoannulata*, *Phellinus igniarius*, *Phellinus linteus*, *Psilocybe azurescens*
6 and *Psilocybe cyanescens*, *Collybia* species and *Coprinus comatus* and the
7 fiber substrate transfer agent is applied to a substrate contaminated with a
8 contaminant selected from the group consisting of polynuclear aromatic
9 hydrocarbons, cyclic hydrocarbons and carbonaceous compounds, chemical
10 pesticides including organophosphates, halogenated compounds, nitrogenous
11 compounds, hormones and pro-hormones, detergents and soaps, textile dyes,
12 bacteria, viruses, protozoa, nematodes, medical wastes, agricultural runoff,
13 urban runoff, silt, sediment, industrial wastes, mine wastes and combinations
14 thereof.

15 18. The mycofiltration composition of claim 14 wherein the landscaping
16 cloths have a form selected from the group consisting of textile, veil, matted,
17 mesh matting, matting rug, felt pressing, blanket, filter, woven, woven
18 roving, open weave, nonwoven, knitted, strand roving, continuous strand,
19 chopped strand, milled fiber, knotted, yarn, braided, high-pressure extrusion,
20 composites and combinations thereof.

- 1 19. A fungal inoculation delivery system for mycofiltration and
- 2 mycoremediation comprising:
 - 3 a) a fungal inoculant selected from the group consisting of mushroom
 - 4 spores, actively growing mycelial hyphae, dried mycelial hyphae,
 - 5 freeze-dried mycelial hyphae, powdered mushrooms, conidia and
 - 6 mixtures thereof; and
 - 7 b) a fiber substrate to which the fungal inoculant is applied selected from
 - 8 the group consisting of geocloths, geofabrics, soil blankets, landscaping
 - 9 fabrics and other fabrics, nettings, rugs, mats, mattings, fiber felt pads,
 - 10 straw tatamis, mattress inserts, burlap bags, papers, fiber logs, fiber
 - 11 bricks, fiber baskets, gabions, mulch and combinations thereof.
- 12 20. The fungal inoculation delivery system of claim 19 wherein the fiber
- 13 substrate comprises materials selected from the group consisting of pressed
- 14 cardboard, corrugated cardboard cardboards, leaf paper, wood-based paper,
- 15 non-wood paper, wood chips, sawdust, wood pulp, wood mulch, wood wastes,
- 16 wood pellets, paper fiber pellets, rag stock, cellophane, hemp, hemp-like
- 17 materials, bamboo, papyrus, jute, flax, sisal, coconut fibers and coir, wheat
- 18 straw, rice straw, rye straw, oat straw and other cereal straws, reeds,
- 19 grasses, grain hulls, seed hulls, cornstalks, corncobs, soybean roughage,
- 20 coffee plants, waste and pulp, sugar cane bagasse, banana fronds, palm
- 21 leaves, the hulls of nuts including almonds, walnuts, sunflower, pecans and

- 1 peanuts, soy waste, cactus waste, tea leaves, agricultural waste products,
- 2 wool, hair, hide and combinations thereof.
- 3 21. The fungal inoculation delivery system of claim 19 wherein the fungal
- 4 inoculant is applied to the fiber substrate and inoculated fiber substrate is
- 5 applied to a separate layer of fiber substrate.
- 6 22. The fungal inoculation delivery system of claim 19 wherein the
- 7 saprophytic fungi is selected from the group consisting of metal-concentrating
- 8 mushroom fungi, phosphorus-rich fungi, anti-bacterial fungi and white rot
- 9 fungi capable of degrading environmentally persistent organic compounds
- 10 and those fungi effective against biological organisms selected from the group
- 11 consisting of bacteria, viruses, yeasts, molds, protozoa, rotifers, nematodes
- 12 and combinations thereof.
- 13 23. The fungal inoculation delivery system of claim 19 wherein the
- 14 saprophytic fungi is a mushroom fungi selected from the group consisting of
- 15 *Pleurotus* species; *Trametes* species; *Ganoderma* species; *Fomes fomentarius*;
- 16 *Fomitopsis officinalis* and *F. pinicola*; *Phellinus igniarius* and *P. linteus*;
- 17 *Psilocybe azurescens* and *P. cyanescens*; *Stropharia rugosoannulata*; *Collybia*,
- 18 *Marasmius* and satellite genera; *Coprinus comatus*; *Lycoperdon perlatum* and
- 19 *L. lilacinum*; *Psathyrella hydrophila* and combinations thereof.

- 1 24. The fungal inoculation delivery system of claim 19 wherein the
- 2 mycofiltration comprises filtering of materials selected from the group
- 3 consisting of biological organisms, sediment and silt.
- 4 25. The fungal inoculation delivery system of claim 19 wherein a fungal
- 5 mycelium is allowed to grow on the fiber substrate and the fungal mycelium
- 6 is metabolically suspended via a process selected from the group consisting of
- 7 refrigeration, drying and freeze-drying.
- 8 26. The fungal inoculation delivery system of claim 19 wherein the delivery
- 9 system additionally comprises a component selected from the group
- 10 consisting of seeds and seedlings and combinations thereof.
- 11
- 12 27. A delivery system for mycotechnologies comprising:
 - 13 a) a component manufactured from a biodegradable material;
 - 14 b) a fungal inoculant selected from the group consisting of spores,
 - 15 mycelium, powdered mushrooms and combinations thereof; and
 - 16 c) seeds.
- 17 28. The delivery system for mycotechnologies of claim 27 wherein the
- 18 component manufactured from biodegradable materials and the fungal
- 19 inoculant and seeds are separately packaged.
- 20 29. The delivery system for mycotechnologies of claim 27 wherein the
- 21 biodegradable material is selected from the group consisting of wood,

- 1 cardboard, paper, straw and biodegradable polymer based materials and
- 2 combinations thereof.
- 3 30. The delivery system for mycotechnologies of claim 27 wherein the
- 4 biodegradable material forms at least part of a container selected from the
- 5 group consisting of boxes, crates, sacks, socks and gabions.
- 6 31. The delivery system for mycotechnologies of claim 27 wherein the
- 7 component is a cardboard box.
- 8 32. The delivery system for mycotechnologies of claim 27 wherein the
- 9 spores and mycelium are selected from the group consisting of saprophytic
- 10 fungi, mycorrhizal fungi, entomopathogenic fungi and combinations thereof
- 11 and the powdered mushrooms are selected from the group consisting of
- 12 gourmet and medicinal mushrooms and combinations thereof.
- 13 33. The delivery system for mycotechnologies of claim 27 wherein the seeds
- 14 are seeds of plants selected from the consisting of vegetables, cereal crops,
- 15 fruits, herbs, spices, shrubs, bushes and other agriculturally useful crops.
- 16 34. The delivery system for mycotechnologies of claim 27 further
- 17 comprising a material selected from the group consisting of liquids, glues,
- 18 adhesives, tackifiers and combinations thereof.
- 19 35. The delivery system for mycotechnologies of claim 27 wherein the
- 20 biodegradable material contains the fungal inoculant and the seeds.

- 1 36. The delivery system for mycotechnologies of claim 27 wherein the
- 2 component manufactured from biodegradable materials is a container at least
- 3 partially filled with a fiber substrate.
- 4 37. The delivery system for mycotechnologies of claim 36 wherein the fiber
- 5 substrate contains the fungal inoculant and the seeds.
- 6 38. The delivery system for mycotechnologies of claim 27 wherein a liquid
- 7 contains the fungal inoculant.
- 8 39. The delivery system for mycotechnologies of claim 38 wherein liquid
- 9 fungal inoculant is applied to the component.
- 10 40. The delivery system for mycotechnologies of claim 38 wherein the
- 11 liquid also includes the seeds.
- 12 41. The delivery system for mycotechnologies of claim 38 wherein the
- 13 liquid is removed after application to the component.
- 14 42. The delivery system for mycotechnologies of claim 27 wherein the
- 15 component is at least a portion of a cardboard box.
- 16 43. The delivery system for mycotechnologies of claim 42 wherein the
- 17 cardboard box becomes a medium for growth when the box is disassembled
- 18 and water is added.
- 19 44. The delivery system for mycotechnologies of claim 42 wherein the
- 20 cardboard box is a component of an educational kit.

1 45. The delivery system for mycotechnologies of claim 44 wherein the kit
2 further comprises an ecological map paired with culturally and ecologically
3 appropriate fungus and plant species.

4 46. The delivery system for mycotechnologies of claim 27 wherein the
5 component is a cardboard component of a rescue kit for refugees, indigenous
6 displaced persons and victims of natural and man-made disasters.

7 47. The delivery system for mycotechnologies of claim 46 wherein the
8 component is a cardboard box.

9 48. The delivery system for mycotechnologies of claim 27 wherein the seeds
10 are seeds of annual plants for use in creating seed stock for future plantings.

11

12 49. A mulch composition comprising a mulch selected from the group
13 consisting of mulched wood chips, sawdust, wood pulp, corrugated cardboard,
14 pressed cardboard, straw, agricultural waste fibers, composts and
15 combinations thereof, a fungal inoculant selected from the group consisting of
16 a saprophytic mushroom inoculant, an entomopathogenic fungal inoculant
17 and combinations thereof, and seeds.

18 50. The mulch composition of claim 49 wherein the composition
19 additionally comprises water.

- 1 51. The mulch composition of claim 49 wherein the fungal inoculant
- 2 further comprises a fungi selected from the group consisting of mycorrhizal
- 3 fungi, parasitic fungi, fungi imperfecti and combinations thereof.
- 4 52. The mulch composition of claim 49 wherein the fungal inoculant
- 5 comprises a plurality of species.
- 6 53. The mulch composition of claim 49 wherein the delivery system
- 7 additionally comprises a component selected from the group consisting of
- 8 fertilizers, soil improvement substances, tackifiers and combinations thereof.
- 9 54. The mulch composition of claim 49 wherein the fungal inoculant is
- 10 allowed to germinate prior to application.
- 11 55. The mulch composition of claim 49 wherein the fungal inoculant is
- 12 allowed to germinate and form mycelium and the mycelium is metabolically
- 13 suspended via a method selected from the group consisting of refrigeration,
- 14 drying and freeze-drying.
- 15 56. The mulch composition of claim 49 wherein the fungal inoculant
- 16 comprises a separate package of fungal inoculant.
- 17 57. The mulch composition of claim 49 wherein the seeds comprise a
- 18 separate package of seeds.
- 19
- 20 58. Agricultural equipment including planting equipment, harvesting
- 21 equipment, equipment for preparing agricultural fields and equipment for

- 1 other agricultural purposes wherein the agricultural equipment further
- 2 comprises a means for delivering fungal inocula.
- 3 59. The agricultural equipment of claim 58 wherein the fungal inocula is
- 4 selected from the group of fungi consisting of saprophytic fungi,
- 5 entomopathogenic fungi, mycorrhizal fungi, fungi imperfecti and
- 6 combinations thereof.
- 7 60. The agricultural equipment of claim 58 wherein the saprophytic fungi
- 8 is selected from the group consisting of *Hypsizygus Ulmarius*, *Stropharia rugosoannulata*, *Coprinus comatus*, *Hypholoma sublateritium* and
- 9 combinations thereof.
- 10 61. The agricultural equipment of claim 58 wherein the fungal inocula
- 11 comprises a separate package of fungal inoculant suitable for use therewith.
- 12 62. The harvesting equipment of claim 58 wherein the fungal inocula is
- 13 utilized to inoculate materials selected from the group consisting of straw,
- 14 corn husks, corn cobs, cotton seeds and cotton wastes and the harvesting
- 15 equipment is selected from the group consisting of round straw balers, square
- 16 straw balers, corn huskers, corn shellers, cotton pickers, cotton strippers and
- 17 cotton gins.
- 18 63. The agricultural equipment of claim 58 wherein:
 - 19 a) the planting equipment is selected from the group consisting of
 - 20 seeders, air seeders, planters, air planters, plate planters, vacuum

- 1 planters, drills, air drills, air seeding systems, row crop cultivators,
- 2 planting systems, inter-row planting systems, between row planting
- 3 systems, rice transplanters and combinations thereof;
- 4 b) the harvesting equipment is selected from the group consisting of
- 5 combines, round balers, square balers, hay cubers, threshers,
- 6 threshing machines, forage harvesters, windrowers, rakes, tedders,
- 7 mowers, rotary mowers, sicklebar mowers, slashers, cutters, straw
- 8 choppers, stalk choppers, corn pickers, cotton strippers, cotton gins,
- 9 corn huskers, shellers, rice harvesters, mechanical fruit pickers,
- 10 mechanical nut pickers, loaders and combinations thereof;
- 11 c) the equipment for preparing agricultural fields is selected from the
- 12 group consisting of sprayers, irrigators, plows, cultivators, air carts,
- 13 tillers, tillage equipment, disks, openers, rippers, harrows, rotary hoes,
- 14 blades, flail shredders, flail cutters, rotary cutters, manure spreaders,
- 15 flame weeders, pruning machines, skids, scrapers, loaders, fertilizer
- 16 spin spreaders, pendulum spreaders and combination thereof; and
- 17 d) the equipment for other agricultural purposes is selected from the
- 18 group consisting of shredders and chippers and combinations thereof.
- 19 64. The harvesting equipment of claim 63 wherein the fungal inocula is
- 20 utilized to inoculate the remaining agricultural wastes.

1 65. The harvesting equipment of claim 63 wherein the fungal inocula is
2 utilized to inoculate the soil.

3

4 66. A method for preserving and restoring habitats and catalyzing habitat
5 recovery utilizing saprophytic fungi as a keystone species, the method
6 comprising:

7 a) inoculating a substrate with a saprophytic mushroom species to form
8 an inoculated substrate; and
9 b) utilizing the inoculated substrate for sheet inoculation of at least one
10 layer of lignin- and cellulose-containing substrate applied in the
11 selected habitat.

12 67. The method for preserving and restoring habitats of claim 66 wherein
13 the lignin- and cellulose-containing substrate in the selected habitat is
14 exposed to water runoff.

15 68. The method for preserving and restoring habitats of claim 66
16 additionally comprising a fungus selected from the group consisting of
17 mycorrhizal fungi, entomopathogenic fungi, parasitic fungi, fungi imperfecti
18 and combinations thereof.

19 69. The method for preserving and restoring habitats of claim 68 wherein
20 the method additionally comprises adding plant sources selected from the
21 group consisting of seeds and seedlings and combinations thereof.

1 70. The method for preserving and restoring habitats of claim 69 wherein
2 the seeds and seedlings are selected from the group of plants consisting of
3 garden vegetables, agricultural crops, grasses, herbs, shrubs, and trees.

4 71. The method for preserving and restoring habitats of claim 69 wherein
5 the selected habitat is selected from the group consisting of gravel roads,
6 farms, forests, riparian zones and buffers, urban landscapes and suburban
7 landscapes.

8 72. The method for preserving and restoring habitats of claim 66 wherein
9 the selected habitat contains a contaminant selected from the group
10 consisting of sediments and silts, organic compounds, inorganic compounds,
11 metals, biological organisms and combinations thereof.

12

13 73. A method for combating chemical and biological contaminants selected
14 from the group consisting of organic compounds, inorganic compounds,
15 metals, biological organisms, silt, sediment and combinations thereof
16 comprising:

17 a) selecting a saprophytic mushroom species capable of remediating the
18 contaminant and obtaining inocula of the saprophytic mushroom
19 species;

20 b) inoculating a fiber structure constructed from the group of materials
21 consisting of mulch, geocloths, geofabrics, soil blankets, landscaping

1 fabrics, fabrics, nettings, rugs, mats, mattings, fiber felt pads, straw
2 tatamis, mattress inserts, burlap bags, papers, fiber logs, fiber bricks,
3 gabions, fiber baskets, cardboards, papers and combinations thereof
4 with the saprophytic mushroom fungi to form a fungally impregnated
5 fiber structure; and
6 c) contacting the fungally impregnated fiber substrate layer with a
7 contaminated substrate.

8 74. The method for combating contaminants of claim 73 wherein the
9 contaminated substrate is an aqueous substrate.

10 75. The method for combating contaminants of claim 74 wherein the
11 fungally impregnated fiber structure filters a contaminant selected from the
12 group consisting of biological organisms, sediments and silts.

13 76. The method for combating contaminants of claim 73 wherein the
14 fungally inoculated fiber substrate is inoculated with fungi selected from the
15 group consisting of phosphorus rich mushrooms and the contaminant is
16 selected from the group consisting of phosphorus containing agricultural
17 pesticides, fertilizers, animal wastes and combinations thereof.

18 77. The method for combating contaminants of claim 73 wherein the
19 fungally inoculated fiber substrate is inoculated with fungi selected from the
20 group consisting of *Pleurotus* species including *P. ostreatus* and *P.*
21 *tuberregium*, *Trametes versicolor*, *Fomes fomentarius*, *Fomitopsis officinalis*,

1 *Fomitopsis pinicola, Phellinus igniarius, Phellinus linteus, Psilocybe*
2 *azurescens* and *Psilocybe cyanescens, Agrocybe arvalis, Collybia* spp.,
3 *Coprinus comatus, Lycoperdon perlatum* and *L. lilacinum*, and *Psathyrella*
4 *hydropophila.*

5 78. The method for combating contaminants of claim 73 wherein the
6 contaminated substrate is a contaminated aqueous substrate selected from
7 the group consisting of lakes, ponds, rivers, streams, creeks, runoffs,
8 effluents, ditches and combinations thereof.

9

10 79. A composition for attracting insects to a centralized locus comprising an
11 extract of at least one entomopathogenic fungal species infused into a
12 biodegradable product selected from the group consisting of wood, wood chips,
13 sawdust, wood pulp, wood mulch, wood wastes, wood pellets, pressed
14 cardboard, corrugated cardboard cardboards, paper including leaf paper,
15 wood-based paper, non-wood paper and paper pellets, rag stock, cellophane,
16 hemp, hemp-like materials, cotton, bamboo, papyrus, jute, flax, sisal, coconut
17 fibers and coir, wheat straw, rice straw, rye straw, oat straw and other cereal
18 straws, reeds, hyacinth, kenaf, grasses, grains, grain hulls, seed hulls,
19 cornstalks, corncobs, soybean roughage, coffee plants, waste and pulp, sugar
20 cane bagasse, banana fronds, palm leaves, the hulls of nuts including
21 almonds, walnuts, sunflower, pecans and peanuts, soy waste, cactus waste,

1 tea leaves, agricultural waste products, wool, hair, hide and combinations
2 thereof.

3 80. The composition for attracting insects of claim 79 wherein the
4 centralized locus is selected from the group consisting of insect monitoring
5 stations, insect bait stations, insect traps and insect treatment and control
6 methods.

7 81. The composition for attracting insects of claim 79 wherein the extract is
8 capable of causing substantial mortality in a targeted insect.

9 82. The composition for attracting insects of claim 79 wherein
10 biodegradable product is inoculated with an entomopathogenic fungi.

11

12 83. A method for attracting insects to a centralized locus comprising
13 infusing an extract of at least one entomopathogenic fungal species into a
14 biodegradable product selected from the group consisting of wood, wood chips,
15 sawdust, wood pulp, wood mulch, wood wastes, wood pellets, pressed
16 cardboard, corrugated cardboard cardboards, paper including leaf paper,
17 wood-based paper, non-wood paper and paper pellets, rag stock, cellophane,
18 hemp, hemp-like materials, cotton, bamboo, papyrus, jute, flax, sisal, coconut
19 fibers and coir, wheat straw, rice straw, rye straw, oat straw and other cereal
20 straws, reeds, hyacinth, kenaf, grasses, grains, grain hulls, seed hulls,
21 cornstalks, corncobs, soybean roughage, coffee plants, waste and pulp, sugar

1 cane bagasse, banana fronds, palm leaves, the hulls of nuts including
2 almonds, walnuts, sunflower, pecans and peanuts, soy waste, cactus waste,
3 tea leaves, agricultural waste products, wool, hair, hide and combinations
4 thereof.

5 84. The method for attracting insects of claim 83 wherein the centralized
6 locus is selected from the group consisting of insect monitoring stations,
7 insect bait stations, insect traps and insect control methods.

8 85. The method for attracting insects of claim 83 wherein the extract is
9 capable of causing substantial mortality in a targeted insect.

10 86. The method for attracting insects of claim 83 wherein biodegradable
11 product is inoculated with an entomopathogenic fungi.

12

13 87. A method for sequestering metals comprising:

14 a) selecting a metal-concentrating saprophytic mushroom species;
15 b) inoculating a fiber substrate with the metal-concentrating saprophytic
16 mushroom species; and
17 c) contacting inoculated fiber substrates with substrates rich in metal.

18 88. The method for sequestering metals of claim 87 wherein the metal-
19 concentrating saprophytic mushroom species is selected from the group
20 consisting of *Collybia*, *Marasmius* and satellite genera.

1 89. The method for sequestering metals of claim 87 wherein the substrates
2 rich in metal are selected from the group consisting of ores, mine effluents,
3 industrial effluents and combinations thereof.

4 90. The method for sequestering metals of claim 89 wherein the metals are
5 removed from the inoculated fiber substrates by means selected from
6 mechanical procedures, chemical procedures, biological procedures and
7 combinations thereof.

8 91. The method for sequestering metals of claim 89 wherein the ore is
9 pretreated with microorganisms.

10

11 92. A method for sequestering carbon and accumulating carbon credits
12 comprising introducing a fungal inoculant and sequestering carbon into a
13 mycelial matrix exoskeleton, internal cell components and extracellular
14 components.

15 93. The method for sequestering carbon of claim 92 further comprising
16 introducing a plant component selected from the group consisting of seeds
17 and seedlings.

18

19 94. A method for inoculating substrates for mycofiltration comprising a
20 sandwich inoculation of two or more layers of fungal inoculum.